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# The effect of firms' environmentally sustainable practices on economic performance

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**ABSTRACT**

Companies are pressured by stakeholders to protect the environment while improving their economic performance. This study aims to further explore the impact of environmentally sustainable practices (ESP) on firm performance (FP), by considering the effects of green employee integration (GEI), environmental sustainability (ES), and employee environmental orientation (EEO). To test the set of hypotheses defined for this article, a closed-ended questionnaire survey was conducted with employees working in the manufacturing sector in China. Data from 325 employees were analysed using SmartPLS 4 software. The results demonstrate that environmentally sustainable practices (ESP) have a direct and significant influence on GEI, ES, and FP. In addition, GEI has a significant direct impact on ES and FP, and ES has a direct impact on FP. This research also demonstrated the partial mediation of GEI and ES and the moderation of EEO on the ESP–FP relationship. This research advances the scope of the ability, motivation, and opportunity theory and the social identity theory. Results suggest that managers should adopt, implement, and promote green practices, as this leads to involving employees in activities that can lessen adverse impacts on society and improve firm's economic performance, including in terms of reputation and profits.

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## 1. Introduction

Environmental sustainability (ES) is one major global concern. It is a hot topic across sectors (Gupta & Gupta, 2020) including manufacturing companies (Muisyo et al., 2022). Because of the negative impacts of overproduction, carbon emissions, and hazardous waste produced by organizations, especially those operating in the manufacturing sector, stakeholders (e.g., consumers, employees, government and non-government

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organizations) pressure companies to adopt, implement, and monitor the success of environmentally sustainable practices (ESPs) (Baah et al., 2021; Dai et al., 2022). ESPs help not only to protect the environment but also improve reputation (Bahta et al., 2021), attract environmentally concerned candidates (Umrani et al., 2022), foster customer loyalty (Justavino-Castillo et al., 2022), and decrease costs, which ultimately increase profits and enhance firm performance (Ren & Hussain, 2022). However, few studies have focused on the effects of ESPs on firm performance (FP) (Ren & Hussain, 2022). In addition, there is a global call for studies exploring the impact of ESPs in the manufacturing sector because of its substantial contributions to waste production and greenhouse gas emission (Baah et al., 2021). Additionally, there are calls in the literature for empirical studies within the context of China's manufacturing (Ren & Hussain, 2022). Therefore, the first objective of this study is to explore the effect of ESPs on manufacturing companies' performance.

Undoubtedly, organizations' strategies are unsuccessful if employees are ignored because they are the central part of strategy implementation (Li et al., 2022; Mahmood et al., 2021; Ren & Hussain, 2022). The social identity theory suggests that employees' involvement in environment-based decision-making is a means to improve the sustainability of organizations (Farooq et al., 2019). Thus, companies should increase participation in the society and empower employees toward environmental sustainability (Tariq et al., 2016). Scholars have observed that the integration of suppliers and customers influences firm's financial and environmental performance (Song et al., 2017; Zhang et al., 2020). From an employee standpoint, numerous scholars have noted the substantial impact of factors such as employee innovativeness, creativity, and eco-innovation capability on a business's overall performance (Ahmad et al., 2022; Tajeddini, 2011). However, there is scant literature on how green employee integration (GEI) leads to ES and FP. Therefore, the second objective of this study is to explore the direct and indirect effects of GEI and ES on FP.

Furthermore, employees' environmental orientation (EEO) changes applicants' job pursuit intentions towards organizational prestige (Chaudhary, 2018) in the context of green human resource management practices. In addition, there is evidence that environment-based orientation strengthens the effects of green practices on employees' environmental performance (Ren & Hussain, 2022) and organizational attractiveness (Merlin & Chen, 2022). However, the moderation effect of EEO requires further investigation (Merlin & Chen, 2022; Ren & Hussain, 2022). Therefore, the third objective of this study is to explore the moderating role of EEO on the ESPs–FP relationship.

Based on the research gaps and objectives described above, this study tackles three research questions: (1) Does ESPs significantly affect GEI, ES, and FP in the context of manufacturing companies? (2) Do GEI and ES mediate the relationship between ESPs and ES and GEI and FP, respectively? (3) Does EEO moderate the ESPs–FP relationship? It includes a quantitative study conducted in China with 325 employees working in the manufacturing sector. The ten hypotheses defined for this article were tested using structural equation modelling.

The reminder of the article is as follows. Next section summarizes the theoretical background based on the ability, motivation and opportunity and social identity theories, and is followed by the development of hypotheses. Section 3 presents the details

on the methodology adopted. Section 4 analyses the findings. The concluding section includes the discussion of findings, theoretical and managerial implications, and points out the main limitations and future research directions.

## 2. Literature review

### 2.1. Theoretical background

#### 2.1.1. Ability, motivation, and opportunity theory

The ability, motivation, and opportunity (AMO) theory proposes that an organization can positively influence its performance by ensuring that all employees have the ability and motivation to complete their work assignments and have sufficient opportunity to add value to the company (Appelbaum et al., 2020). Applying this theory to a firm's performance means that organizations should improve their working conditions and enhance and retain employees' ability to work and motivation over time (De-Lange, 2014). Interchangeably, ensuring that employees work efficiently contributes to the firm's performance; organizations should be able to motivate employees by offering the right opportunities (Pak et al., 2019; Van-der-Heijden et al., 2015). Ability refers to an employee capacity to perform work (Jiang et al., 2013). At the individual assessment level, ability could be defined as employees' individual skills, abilities, and knowledge. Motivation includes behaviors that demonstrate employee readiness to work (Jiang et al., 2013). While ability focuses on employees' competencies to contribute to the organization, motivation refers to the length to which employees are ready to utilize such abilities (Liao et al., 2009). Consequently, opportunity refers to the means to convert employees' abilities into outcomes (Jiang et al., 2013). Opportunities consist of autonomy, task importance, and the perceived influence that employees have on their workplace, using their skills in their job and contributing to the firm's success (Ehrnrooth & Björkman, 2012; Kremmydas & Austen, 2020; Purcell & Hutchinson, 2007).

#### 2.1.2. Social identity theory

The social identity theory posits that individuals inherently wish to differentiate themselves from others by relying on group memberships and by their readiness to sacrifice outright rewards to sustain comparative superiority over rivals. Tajfel (1978) established a model of individuals' identity-oriented motivations that enable group differentiation and identified both individual and collective responses required for societal group status. According to social identity theory, classification of the social world is an inevitable natural human behavior to simplify the social system (Hogg, 2000). As we classify individuals into groups, we also classify in terms of social identification. Once individuals integrate one group (i.e., the 'in-group'), they seek methods to achieve positive feelings from that affiliation. Higher consideration for their 'in-group' compared to other social groups is a way to obtain such feelings (Hogg, 2000). Hence, pursuing positive uniqueness for one's 'in-group' is associated with negative views and behaviors concerning 'out-groups' and with predisposition for discrimination.

## 2.2. Hypotheses development

### 2.2.1. Firm's performance (FP)

Successful organizations act as key elements of economic growth. They are seen as engines of social, economic, and political growth (Taouab & Issor, 2019), but depend on higher performance to survive in a competitive business environment (Saura et al., 2023). Organizational performance focuses on the ability to effectively utilize existing resources to consistently achieve business goals, while nurturing connections with customers (Peterson et al., 2003). As explained by Tajeddini et al. (2013), performance is a subjective measure that evaluates efficiency in terms of return on assets, investment, and sales, while effectiveness is assessed based on market, profit, and sales growth. The measurement of FP may consider several antecedents, including operating efficiency and cost effectiveness (Tajeddini, 2011), a balanced scorecard approach (Kaplan & Norton, 2005), financial, customer, and internal processes perspective, innovation and learning perspective, stakeholder satisfaction, capabilities, performance prism, processes, strategies, and stakeholder contribution (Taouab & Issor, 2019). Accordingly, and as explained in the next sections, this study considers ESPs, GEI, ES, and EEO as predictors of FP.

### 2.2.2. Environment sustainable practices (ESPs)

Environmental issues have become an essential impediment to sustainable development (Lin & Ho, 2011) and protection of the environment is required worldwide. Sustainability and social responsibility refer to the consciousness of organizations to not only meet their current needs but also protect the environment for future generations. Hence, organizations develop sustainable practices during the economic development phase and are supposed to sustain or enlarge the efficient use of resources (Pathak et al., 2018). Besides being motivated by preserving the environment for future generations, organizations focus on and implement sustainable practices for reasons such as improving reputation and increasing market share, profits, or sales. Another reason is to protect the nature for the upcoming generations (Ren & Hussain, 2022). Organizations' ESPs involve reducing waste, adopting environmentally friendly production methods, utilizing green energy sources, and producing environmentally friendly products and services (Hossain et al., 2020). According to the AMO theory, a firm can enhance its performance through ESPs by investing in its employees, who not only improve performance but also promote and implement sustainable practices (Singh et al., 2020). In this regard, it can be argued that ESPs not only enhance the performance of a firm but also contribute to preserving the environment.

The relationship between sustainable practices and environmental performance has been studied extensively in past research (Hutomo et al., 2020). Overall, ESPs are considered essential to achieving environmental sustainability (ES) (Dai et al., 2022; Justavino-Castillo et al., 2022; Li et al., 2022). As such, this study posits that:

H1a: ESPs positively affect ES.

Moreover, according to the Social Identity Theory, if organizations have ESPs, their employees will perceive a sense of belonging to the organization as a social group (Hogg, 2000). This, in turn, is expected to lead to the adoption of environmentally friendly behaviors that support sustainability. As a result, it is expected that:

H1b: ESPs positively affect GEI.

Following the AMO theory, studies have consistently suggested that the adoption of green human resource management practices can significantly enhance a firm's financial performance (Singh et al., 2020). Accordingly, several studies have stressed the positive impacts of ESPs on FP (Bahta et al., 2021; Gupta & Gupta, 2020; Li et al., 2022; Ren & Hussain, 2022), Based on these contributions, this study posits that:

H1c: ESPs positively affect FP.

### 2.2.3. Green employee integration (GEI)

GEI is the integration of employees' green behavior concerning the organization's environmentally sustainable activities and performance. Such green employee behaviors are usually context-oriented, so they may show distinct green behaviors at work, at home, when deciding what to buy, or choosing means of transportation (Lynn, 2014). GEI in the workplace has been linked to both employees' task-oriented green behavior and voluntary green behavior (Norton et al., 2015). Task-oriented green behaviors are mostly linked to work-related tasks (Norton et al., 2015) and daily routines (Bissing-Olson et al., 2013). Voluntary or proactive green behaviors are associated with employees' green initiatives beyond the assigned tasks (Norton et al., 2015) and formal activities (Bissing-Olson et al., 2013). Integration of employees' task-oriented and voluntary green behaviors maximizes the overall environmental sustainability (Bissing-Olson et al., 2013; Sabbir & Taufique, 2022; Shi et al., 2022). In fact, organizational ability, in general, will enhance the ability of individual employees to perform sustainably and will motivate them to contribute to the company's sustainability goals, namely its environmental sustainability. This could be done by providing them with suitable opportunities, such as training sessions, guidance and sufficient support to participate in green integration. As such, employees will feel more motivated to achieve environmental sustainability (Li et al., 2022; Shi et al., 2022). Consequently, this study proposes the following relationship:

As such, this article posits that:

H2a: GEI positively affects ES.

In line with these contributions, GEI is also expected to positively affect the firm's performance, due to its context-oriented (Lynn, 2014) and task-oriented nature (Norton et al., 2015). Such proactive initiatives are essential to foster firm performance, considering that they are able to provide competitive advantage and to achieve business goals (Li et al., 2022; Mahmood et al., 2021; Peterson et al., 2003; Shi et al., 2022). Hence, it is hypothesized that:

H2b: GEI positively affects FP.

### 2.2.4. Environmental sustainability (ES)

Environmental sustainability (ES) is an essential element in business operations (Ahmad et al., 2021; Li et al., 2022). ES refers to the practices an organization adopts concerning the preservation of natural resources and the environment, such as soil, air, and water (Owusu-Agyei et al., 2019). Recently, environmental sustainability has

been considered a global challenge due to global warming (Papalexiou & Montanari, 2019), limited natural resources (Tsuboi, 2019), greenhouse gas emissions (Yusuf et al., 2020), and customer awareness of eco-friendly production practices of the organizations (Afum et al., 2020).

ES is also positively related to FP, as companies that embrace environmental challenges are expected to benefit from enhanced reputation (Bahta et al., 2021; Khanna & Anton, 2002) and increased sales volume (Khanna & Anton, 2002). Based on these contributions, it is hypothesized that:

H3: ES positively affects FP.

#### 2.2.5. Mediation of GEI and ES

According to social identity theory, green behaviors are important for employees to develop their 'in-group' and 'out-group' social connections and to be known for their efforts to protect the environment (Harwood, 2020; Hogg, 2000). This is also linked to ability, motivation and opportunity theory, as employees' desires and abilities to take part in environmental protection activities urge them to be self-motivated and, through the organizational efforts (Jiang et al., 2013), to be rewarded (opportunity) for their environmentally friendly behavior. In line with these contributions, it is expected that:

H4: GEI positively mediates the relationship between ESPs and ES.

Research has identified that organizations desire to enhance their environmental performance by introducing green duties and tasks (Schmit et al., 2012), as employee green behaviors are often required by organizations and included in job descriptions (Ones & Dilchert, 2012). Yet, the concept of employee green behavior and its integration with business activities is relatively new. GEI is also linked with the 'in-group' and 'out-group' of the social identity theory (Hogg, 2000), as environmental sustainability associated with both groups may foster relationships concerning sustainable work practices. Based on these contributions, this study proposes that:

H5: ES positively mediates the relationship between GEI and FP.

Since environmental sustainability and employee green behavior are intervening constructs, it is essential to consider the direct relationships between several paths in the conceptual model. For instance, ESPs affect GEI, environmental sustainability, and FP (Hossain et al., 2020; Olawumi & Chan, 2020). GEI also directly affects environmental sustainability and firm performance (Bissing-Olson et al., 2013; Lynn, 2014; Norton et al., 2015). Likewise, environmental sustainability also directly affects firm performance. Considering these direct relationships, it is vital to explore the intrinsic indirect effects. For example, ESPs lead to firm performance, through its effect on GEI and ES. This mechanism is further explained by integrating social identity theory and ability, motivation and opportunity theory. Sustainability practices at the organization level present an opportunity for employees to practice environment-friendly tasks and increase their abilities (Jiang et al., 2013) with training, counselling, coaching, and assistance to fulfil their environmental sustainability goals and ultimately to achieve firm performance (Appelbaum et al., 2020). Therefore, this study proposes that:

H6: GEI and ES mediate the relationship between ESPs and FP.

#### 2.2.6. Employee's environmental orientation (EEO)

The protection of the natural environment has become a primary responsibility of company owners and top management from a commercial perspective (Leonidou et al., 2015). Environmental orientation indicates the level to which an organization is indulged in managing environmental damage (Fraj-Andrés et al., 2009). Due to the importance of understanding and reducing the effect an organization has on the environment, environmental orientation also consists of measures that an organization undertakes to minimize their activities' damaging effects on the environment (Banerjee, 2002). Managers are indulged in the development of strategies for the safety of the natural environments (Javed et al., 2019; Roscoe et al., 2019), reducing pollution (Xu et al., 2019) and implication of the environmental management methods (Singh, 2019).

In such a context, EEO refers to employees' environmental responsibility. Current findings on the inclusion of employees and business organizations in environmental actions suggest that, if efficiently managed, it can increase firm performance (Majid et al., 2020). In addition, employees' interest (orientation) in environmental protection is essential for an organization to respond to environmental events (Lund-Thomsen, 2004). According to AMO theory, EEO is also influenced by an individual's ability recognize environmental protection as their in-group responsibility and action (Hogg, 2000). This can lead to inner motivations and responsiveness to workplace incentives to comply with environmental regulations, which can be facilitated by relevant opportunities to comply with environmental orientation within the organization (Appelbaum et al., 2020). Thus, this study proposes the following relationship:

H7: EEO moderates the relationship between ESPs and FP such that EEO strengthens the relationship.

Figure 1 illustrates the conceptual model developed for this study, which contains the relationships proposed above. ESP is the independent variable, GEI and ES are the mediators, EEO is the moderator, and FP is the dependent variable.

## 3. Method

### 3.1. Participants and procedures

Considering the direct, indirect, and moderating effect of constructs comprised in the conceptual model, this study used a multi-wave research design. A multi-wave design has been suggested to mitigate bias issues (Pesämaa et al., 2021). In particular, ESP (independent variable) was tapped in the first wave, GEI and ES (mediators) in the second, EEO (moderator) in the third, and FP (dependent variable) in the last wave. Each wave lasted for 1 month. Cross-sectional data were gathered through an online survey of employees working in manufacturing companies across China. Cross-sectional data was employed because they offer more opportunities for enhancing conceptual development and theorical advancement (Pesämaa et al., 2021). To ensure that the same

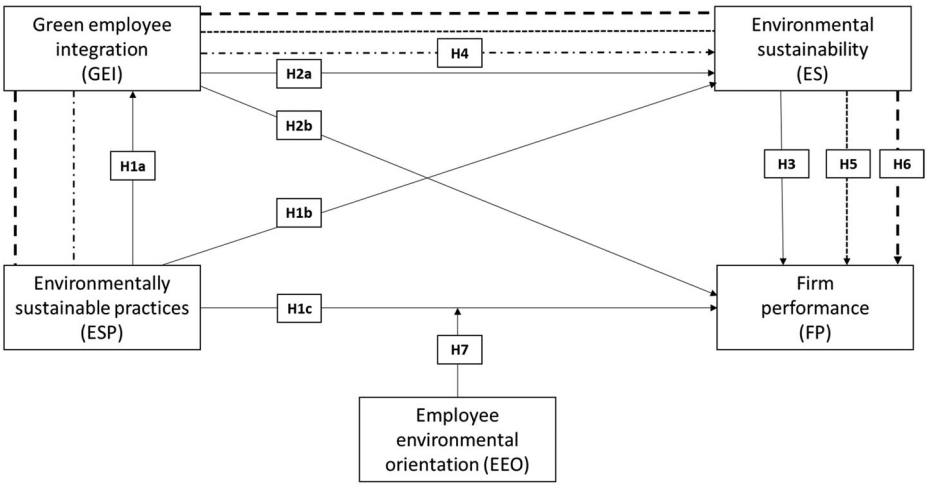


**Figure 1.** Conceptual model.
Source: Authors.

employee participated in data collection, IP addresses were traced according to the related instructions shared with participants via email.

Regarding the ethical principles adopted, it should be noted that this study was carried out in accordance with the recommendation of the Ethical Principles of Psychologists and Code of Conduct by the American Psychological Association (APA). All participants gave written informed consent in accordance with the Declaration of Helsinki. The research protocol was approved by the ethics committee of the first author's university.

The minimum sample dimension recommended for this study was 280 (28 items of 5 variables), following the criterium of 10 responses for item (Pesämaa et al., 2021). A link to an online self-administered questionnaire was distributed to 700 individuals, inviting them to participate in the study. Having a higher number of participants provided a hedge against potential issues of low response rate, response lag time, and outliers resulting from inaccurate responses. Of the 700 distributed questionnaires in the first wave, 629 responses were obtained, resulting in an 89.8% response rate. In the second wave, 547 out of 629 participants collaborated, which represented an 86.9% response rate. In the third wave 420 out of 547 questionnaires were returned, yielding a response rate of 76.7%. In the last wave, 325 of the 420 employees working in China's manufacturing sector returned their responses, generating a 77.4% response rate. Hence, the study obtained 325 valid responses.

192 (59.07%) were male and 133 (40.93%) were female. Regarding the age 48 (14.77%), 133 (40.93%), 108 (33.23%), and 36 (11.07%), were aged 18–25, 26–35, 36–45, and over 45 years, respectively. Additionally, 63 (19.38%), 86 (26.46%), 128 (39.39%), and 48 (14.77%) had basic, bachelor, master, and other levels of education, respectively.

### 3.2. Measures

This study used a five-point Likert scale (1 = strongly disagree and 5 = strongly agree) to record the responses of the participants. All construct items were borrowed from

previous studies. In typical, Six items for the ESPs were adapted from Abdou et al. (2022) and Kularatne et al. (2019). Six items for the GEI were adapted from Shi et al. (2022). Five items for the EEO were adapted from Etheredge (1999). Five items for ES were adapted from Sardana et al. (2020). Finally, FP was assessed using seven items adapted form Das (2018) and Umrani et al. (2022).

### 3.3. Data analysis tools

Several statistical approaches were employed for the data analysis. This study used the Statistical Package for the Social Sciences (SPSS) for data curation, namely to identify missing values, purify data, and exclude multivariate and univariate outliers. Partial least squares structural equation modeling (PLS–SEM) performed with SmartPLS v.4 software was used to test the model. This software is widely employed across disciplines such as management and social sciences (Hair et al., 2019; Qalati et al., 2022) to test complex sets of relationships. In addition, PLS–SEM does not require large sample size or assumptions of normality (Umrani et al., 2022) and the its covariance-based structural equation modeling is particularly suitable for testing variable validity and for predicting research models.

### 3.4. Common method bias (CMB)

Common method bias (CMB) is 'variance that is attributable to the measurement method rather than to the constructs the measures represent' (Podsakoff et al., 2003, p. 879). There are several ways to reduce the influence of CMB such as ensuring that participation is confidential and that the questionnaire isfree from grammatical errors (Rehman et al., 2022). To test CMB, the existing literature has widely employed Harman's single-factor test; however, it has been criticized as inadequate for measuring CMB (Pesämaa et al., 2021). Thus, this study used the full collinearity variance inflation factor (VIF) test suggested and used in recent studies (Hair et al., 2019; Qalati et al., 2022). In the current study, the VIF values were between 1.678 and 3.040 which is below the acceptable threshold of 3.33 suggested Hair et al. (2019) (see Table 1).

## 4. Results

PLS–SEM is particularly adequate for complex models containing mediation (Preacher & Hayes, 2004). In addition, it accurately calculates measurement errors and offers estimation for mediation and moderation effects (Ghouri et al., 2020). According to Hair

**Table 1.** Measurement model.

| Constructs | Items | Loadings | CA | CR | AVE | VIF |
|---|---|---|---|---|---|---|
| Environment sustainable practices (ESPs) | ESPs1–ESPs6 | 0.895–0.917 | 0.951 | 0.953 | 0.808 | 2.644 |
| Green employee's integration (GEI) | GEI1–GEI6<br>*GEI3 removed* | 0.810–0.927 | 0.920 | 0.924 | 0.760 | 2.631 |
| Environment sustainability (ES) | ES1–ES5 | 0.834–0.921 | 0.941 | 0.944 | 0.810 | 3.040 |
| Employee's environmental orientation (EEO) | EEO1–EEO5<br>*EEO3 removed* | 0.761–0.833 | 0.823 | 0.850 | 0.647 | 1.678 |
| Firm performance (FP) | FP1–FP6 | 0.823–0.927 | 0.952 | 0.956 | 0.778 | |

Source: Authors.

et al. (2019) PLS–SEM comprises a two-step approach: measurement of the outer model for data assessment and measurement of the inner model for hypothesis testing (Hair et al., 2019; Umrani et al., 2022).

### 4.1. Measurement of the outer model

The outer model was examined by calculating the individual items, internal consistency reliability, and convergent and discriminant validity (Table 1). Typically, reliability is the degree to which an estimate is consistent and repeatable. Reliability was assessed through factor loadings, composite reliability (CR), and Cronbach's alpha (CA). Item with loadings between 0.761 and 0.927 were retained, as they were above the ≥0.70 acceptable threshold (Hair et al., 2019). GEI3 and EEO3 items of GEI and EEO were removed from the study, as low factor loadings indicate poor reliability (Hair et al., 2019). In addition, CR and CA were considered to assess internal consistency reliability. CA and CR values were retained at an ≥0.70 acceptable threshold (Hair et al., 2019). Thus, it is possible to conclude that the outer model is internally reliable and consistent.

Convergent reliability refers to the extent to which an item measures its construct and was assessed average variance extracted (AVE). AVE values were between 0.647–0.808 which is in accordance with the ≥0.50 acceptable threshold (Hair et al., 2019).

Discriminant validity is the degree to which a variable is distinct from other variables. It was examined through Fornell and Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. According to Fornell and Larcker (1981), the square root of a variable's average variance extracted should be higher than the correlation with other constructs. Table 2 shows that AVE square root (in bold and italics) of each construct is greater than correlation with other variables. HTMT ratio is acknowledged as an advanced approach to test discriminant validity. Table 2 shows that HTMT values are below the 0.85 acceptable standard (Hair et al., 2019; Rehman et al., 2022). Hence, discriminant validity was confirmed for the variables included in the model.

### 4.2. Measurement of inner model

The inner or structural model was assessed in the second phase of the PLS–SEM. This phase included hypothesis testing and predictive relevance evaluation. Figure 2 illustrates that all

**Table 2.** Discriminant validity (Fornell Larcker and HTMT ration criterion).

| Constructs | EEO | ES | ESP | FP | GEI | Mean | S.D. | Kur. | Ske. |
|---|---|---|---|---|---|---|---|---|---|
| ***Fornell Larcker criterion*** | | | | | | | | | |
| Employee's environmental orientation (EEO) | ***0.804*** | | | | | 3.906 | 0.894 | 0.442 | −0.805 |
| Environment sustainability (ES) | 0.460 | ***0.900*** | | | | 3.256 | 1.283 | −1.002 | −0.277 |
| Environment sustainable practices (ESPs) | 0.411 | 0.748 | ***0.899*** | | | 3.103 | 1.316 | −1.232 | −0.183 |
| Firm performance (FP) | 0.423 | 0.746 | 0.752 | ***0.882*** | | 3.134 | 1.281 | −1.109 | −0.164 |
| Green employee's integration (GEI) | 0.505 | 0.726 | 0.712 | 0.730 | ***0.872*** | 3.251 | 1.176 | −0.707 | −0.332 |
| ***HTMT ratio*** | | | | | | | | | |
| Employee's environmental orientation (EEO) | | | | | | | | | |
| Environment sustainability (ES) | 0.519 | | | | | | | | |
| Environment sustainable practices (ESPs) | 0.448 | 0.790 | | | | | | | |
| Firm performance (FP) | 0.450 | 0.782 | 0.785 | | | | | | |
| Green employee's integration (GEI) | 0.550 | 0.777 | 0.757 | 0.772 | | | | | |

**Notes:** S.D. = Standard deviation; Kur. = Kurtosis; Ske. = Skewness.
Source: Authors.

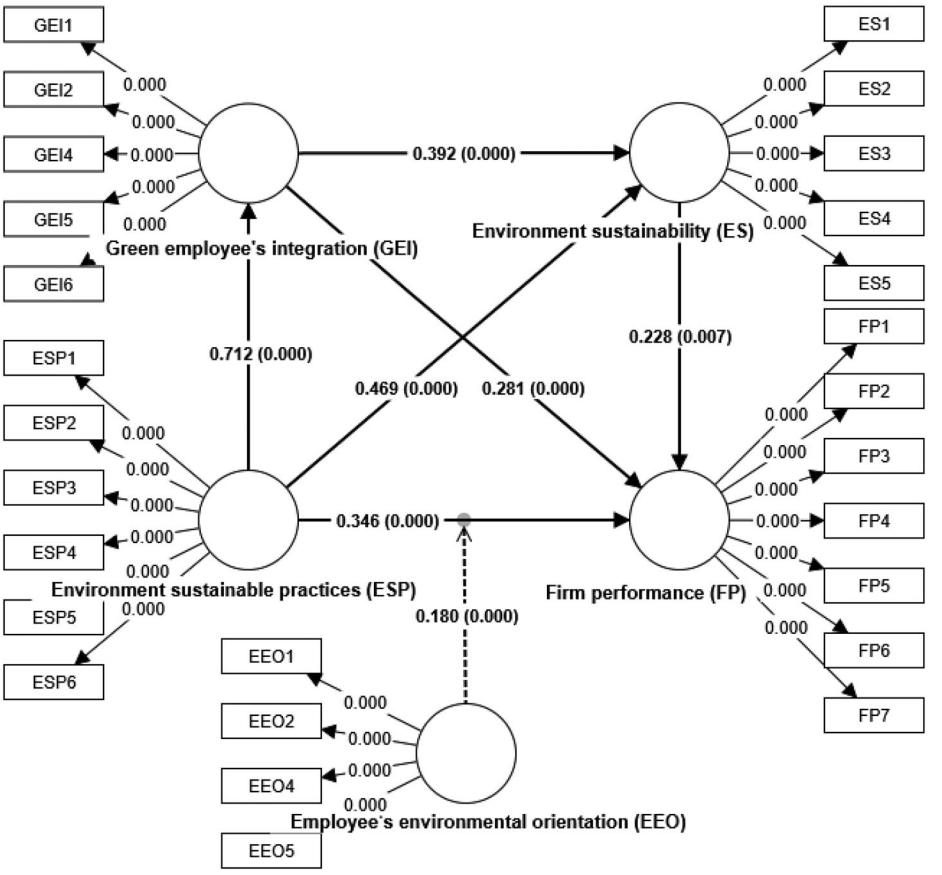


**Figure 2.** Structural equation modeling using bootstrapping technique.
Source: Authors.

direct hypotheses of the study were supported, given that all p-values are $<0.05$. Among the direct effects, ESP has a strong influence on GEI ($\beta = 0.712$). Hence, hypotheses H1, H2, and H3 were supported by this study. In addition, GEI and ES play a positive and significant ($p < 0.05$) mediating role. Thus, hypotheses H4, H5, and H6 are supported (see Table 3). Accordingly, this study also supports the moderation effect of EEO as hypothesized by H7.

The coefficient of determination ($R^2$) and $Q^2$ (cross-validate redundancy) were used to evaluate predictive power of the model. $R^2$ values of $<0.30$, 0.30–0.60, and $>0.60$ is considered low, moderate, and high prediction value (Ahmed et al., 2019). In this study, $R^2$ values of 50.7% (GEI), 63.6% (ES), and 69.1% (FP) were considered moderate and high (Table 3). ESPs, GEI, ES, and EEO explained 69.1% of the variance in FP. Furthermore, $Q^2$ was used to estimate the relevance of the model. $Q^2$ values of 0.02–0.15, 0.15–0.35, and $>0.35$ indicate small, medium, and higher effects (Rehman et al., 2022). This study found that GEI (0.382) had medium relevance effect, while ES (0.510), and FP (0.523) had high relevance effects (see Table 3).

Additionally, some scholars recommend examining the effect size ($f^2$) of each path to further explore $R^2$ and moderation effects (Hair et al., 2019; Rehman et al., 2022). $f^2$ values of 0.05–0.15, 0.15–0.35 and $>0.35$ are considered a small, medium, and high effects, respectively (Rehman et al., 2022). Table 3 demonstrates that ESPs, GEI, and

**Table 3.** Hypotheses testing.

| Hypothesis | Relationship | β | *t*-value | *p*-value | CI 2.5% | CI 97.5% | Decision | $f^2$ |
|---|---|---|---|---|---|---|---|---|
| ***Direct effect*** | | | | | | | | |
| *H1a* | ESPs→ES | 0.469 | 8.61*** | 0.000 | 0.364 | 0.580 | Supported | 0.298 |
| *H1b* | ESPs→GEI | 0.712 | 29.111*** | 0.000 | 0.664 | 0.760 | Supported | 1.030 |
| *H1c* | ESPs→FP | 0.346 | 5.444*** | 0.000 | 0.233 | 0.482 | Supported | 0.146 |
| *H2a* | GEI→ES | 0.392 | 7.148*** | 0.000 | 0.284 | 0.497 | Supported | 0.208 |
| *H2b* | GEI→FP | 0.281 | 4.98*** | 0.000 | 0.173 | 0.392 | Supported | 0.097 |
| *H3* | ES→FP | 0.228 | 2.706** | 0.007 | 0.044 | 0.377 | Supported | 0.146 |
| ***Indirect effect*** | | | | | | | | |
| *H4* | ESPs→GEI→ES | 0.279 | 7.812*** | 0.000 | 0.207 | 0.347 | Supported | |
| *H5* | GEI→ES→FP | 0.090 | 2.461* | 0.014 | 0.017 | 0.161 | Supported | |
| *H6* | ESPs→GEI→ES→FP | 0.064 | 2.503* | 0.012 | 0.012 | 0.113 | Supported | |
| ***Moderating effect*** | | | | | | | | |
| *H7* | EEO x ESPs→FP | 0.180 | 5.34*** | 0.000 | 0.115 | 0.250 | Supported | 0.054 |

Critical values $*p < 0.05$; $**p < 0.01$; $***p < 0.001$.
$R^2$ (GEI) = 0.507; $R^2$ (ES) = 0.636; $R^2$ (FP) = 0.691.
$Q^2$ (GEI) = 0.382; $Q^2$ (ES) = 0.510; $Q^2$ (FP) = 0.523.
Goodness of fit→SRMR = 0.067, Chi–Square = 2,511.969, d_ULS = 1.700, d_G = 1.610, NFI = 0.761.
Source: Authors.

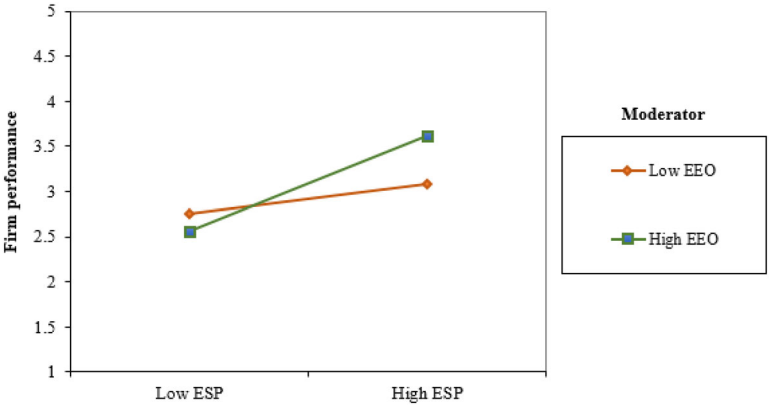


**Figure 3.** Moderation effect of EEO on the ESPs–FP relationship.
Source: Authors.

ES have small effects on FP. In contrast, ESP has a medium effect on ES (0.298) and a large effect on GEI (1.030). Accordingly, the moderation effect of EEO on the relationship between ESP and FP is small (0.054).

The power of moderation effect was further assessed by comparing the $R^2$ of the model including and excluding the moderator, as suggested by Cohen (1988) ($f^2FP$= ($R^2$included - $R^2$excluded)/(1 - $R^2$included) = (0.691 − 0.674)/(1 − 0.691) = 0.055). Figure 3 reflects the slope of moderation of EEO on the link between ESPs and FP. It demonstrates that the relationship becomes stronger for higher levels of EEO.

## 5. Conclusion

### 5.1. Discussion

This study improves our understanding of the effects of ESPs, GEI, and ES on the FP. Additionally, it advances current research, by demonstrating that the impact of ESP on FP is mediated by GEI and ES and is moderated by EEO.

This study found that ESP positively and significantly influences the GEI (β = 0.712, t = 29.111, p = 0.000), ES (β = 0.469, t = 8.610, p = 0.000), and FP (β = 0.346 t = 5.444, $p = 0.000$), thus supporting H1a–c. These findings indicate that companies can increase GEI, ES, and FP by committing to green behavior, such as adopting green technology, motivating employees to effectively follow sustainable processes, and implementing paper and plastic reduction practices, to name but a few. Most prominently, it was found an ESP increase by one unit would result in increases in GEI, ES, and FP of 71.2%, 46.9%, and 34.6%, respectively. These findings are consistent with those of Hutomo et al. (2020) and Shi et al. (2022).

In addition, this study demonstrates that GEI positively and significantly influences ES (β = 0.392, t = 7.148, p = 0.000) and FP (β = 0.281 t = 4.980, $p = 0.000$); thus supporting H2a–b. These findings infer that when employees achieve environmental goals collectively, they work together to reduce negative environmental impacts, they accumulate and share environmental knowledge, they conjointly anticipate and solve environmental issues, and develop mutual understanding of responsibilities regarding the environment and FP. Overall, this will positively impact ES and FP. It was also found that, if GEI increases in one unit, ES and FP will increase by 39.2% and 28.1%, respectively. These findings are in line with arguments by Bissing-Olson et al. (2013) and Sabbir and Taufique (2022) who highlight the importance of GEI in the context of environmental protection and concerns.

This study also observed a positive and significant influence of ES on FP (β = 0.228 t = 2.716, p = 0.007), thus supporting H3. This result indicates that when employees are actively involved in activities such as monitoring waste, energy, and water usage in facilities and implementing a systematic approach to achieving and setting environment related targets, it will increase FP. Moreover, it was found that an increase of ES in one unit leads to a 22.8% increase in FP. These findings are consistent with those of Gupta and Gupta (2020).

Furthermore, this study observed that GEI positively and significantly mediates the relationship between ESPs and ES, and ES significantly mediates the relationship between GEI and FP. In addition, this study observed serial mediation of GEI and ES between the ESPs and FP. Hence, H4, H5, and H6 were supported. Following Baron and Kenny (1986) approach, a partial mediation is assumed if direct and indirect effects are significant. Thus, this study concludes that GEI and ES partially mediate the proposed relationship. Moreover, this research demonstrated a positive and significant moderation of EEO (β = 0.180 t = 5.34, $p = 0.000$), thus supporting H7. This result implies that the relationship between ESPs and FP can be moderated by EEO, as the relationship was found stronger for higher EEO. This furthers the importance of environmental orientation for manufacturing companies, and is consistent with contributions of Majid et al. (2020).

### 5.2. Theoretical contributions

This study has several theoretical contributions. Firstly, it extends AMO theory and social identity theory by proposing a set of relationships, including moderation and mediation effects, that shed further light on the impact of environmentally sustainable

practices on firm performance. Although limited studies have explored how GEI improve the FP and ES from a theoretical perspective (Merlin & Chen, 2022; Ren & Hussain, 2022; Singh et al., 2020), this study addresses this gap by conceptualizing a framework that combines AMO and social identity theories. In addition to providing novel evidence for the model in the context of the manufacturing sector in China, it offers a useful conceptual model that can be applied to a broader range of contexts. Secondly, the study provides evidence for the mediating role of GEI in the relationship between ESPs and ES, as well as ESPs and FP, and the mediation of ES in the relationship between ESPs and FP, and GEI and FP, in the context of the manufacturing sector in China (Hossain et al., 2020; Olawumi & Chan, 2020). Finally, this research makes a contribution to the existing literature on the moderating role of EEO. While prior studies have investigated the link between green human resource management practices and talent attraction (Chaudhary, 2018), this research provides new insights into the moderation effect of environmental orientation.

### 5.3. Practical contributions

This article provides valuable insights for practitioners and policymakers in addressing environmental issues. Firstly, the positive effects of ESPs highlight the importance for companies to adopt and promote green initiatives that engage their employees in reducing negative impacts on society while improving their financial performance. Secondly, the role of GEI in enhancing both ES and FP suggests that companies should actively involve their employees in their environmental policies and practices to promote collective efforts towards environmental protection and financial success. Lastly, the moderating effect of EEO highlights the importance for companies to foster an organizational culture that values and prioritizes environmental norms and values, which can further increase the impact of ESPs on FP.

### 5.4. Limitation and future research directions

This study has several limitations that provide avenues for future research. It was conducted in an emerging market (China) and within the manufacturing sector, which restricts the generalization of findings. It is recommended that future research replicate the model in other contexts, such as developed and less developed countries, as well as in different sectors, such as hospitality and retail. The use of cross-sectional, online survey-based data could potentially introduce some bias. Future studies may consider the use of longitudinal data, collected in-person, to minimize these limitations. Additionally, data science techniques (Saura et al., 2021) should also be considered as an alternative to surveying individual perceptions and opinions. This study investigated the moderating influence EEO on the relationship between ESPs and financial performance (FP). However, it is possible that other moderators exist and future research could examine these additional effects on the relationships within the model. Moreover, the focus of this study was on the integration of employees on sustainability policies and practices. However, future research should also consider the potential impacts of integrating other stakeholders such as customers, suppliers, and government. Finally, this

study utilized a general measure of firm performance, rather than more specific dimensions such as economic, financial, and social performance. It is suggested that future research examine these dimensions in measuring firm performance.

## Disclosure statement

The authors report there are no competing interests to declare.

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